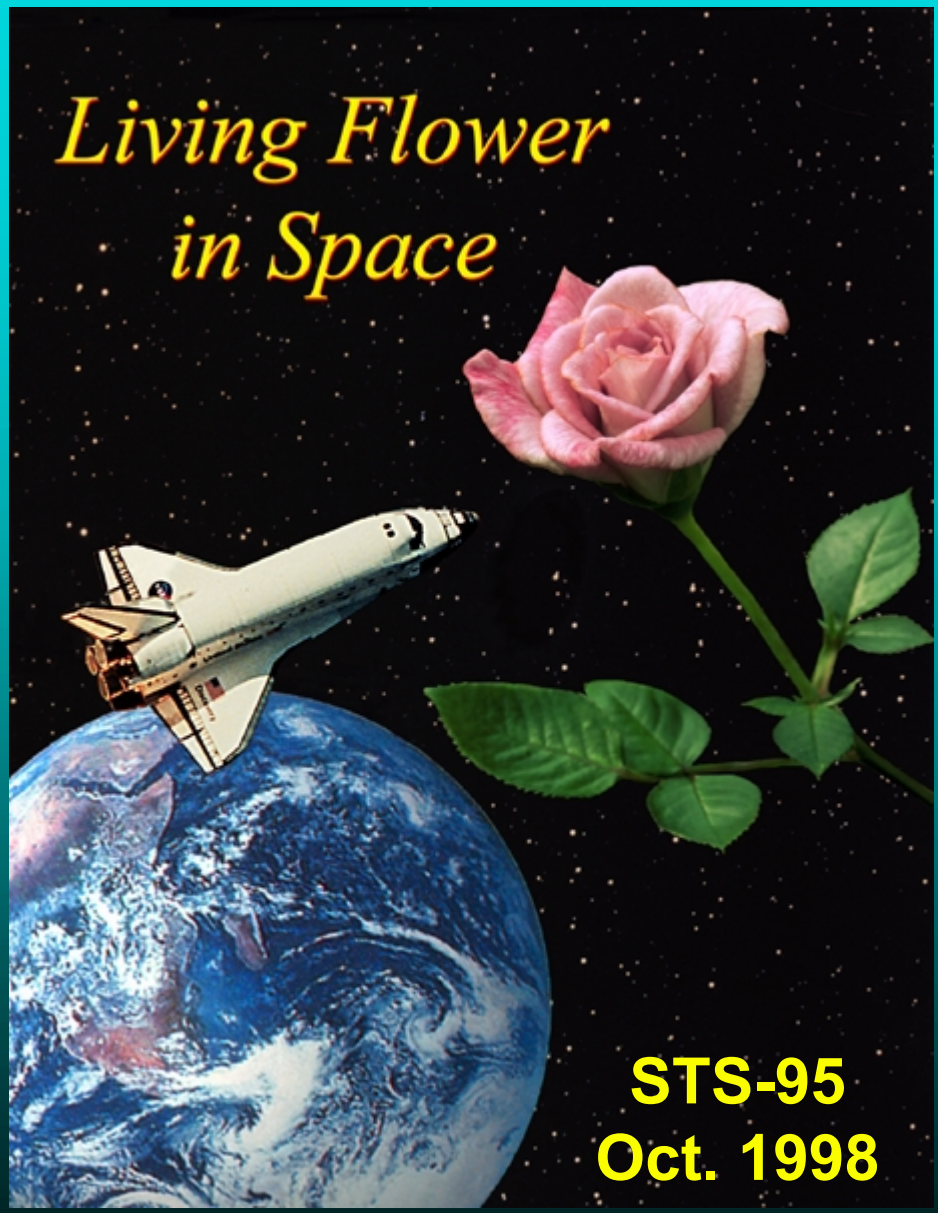
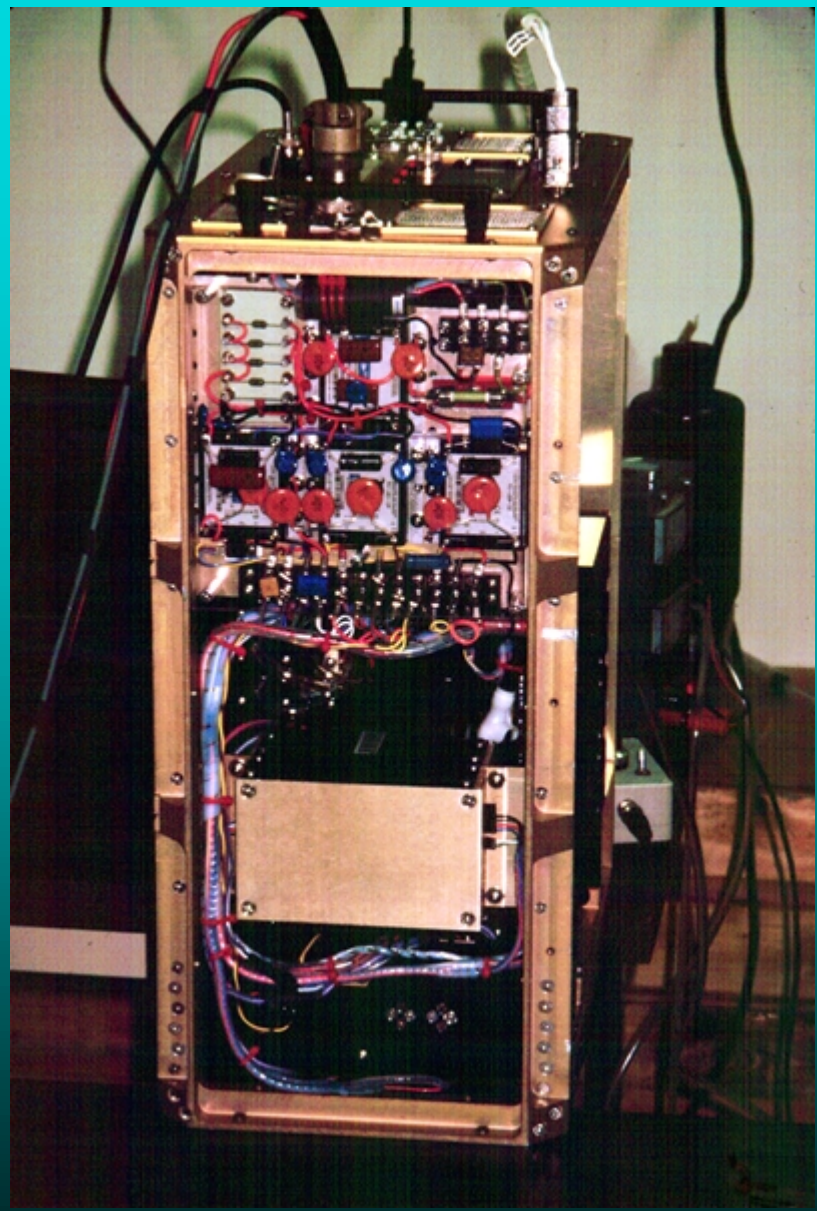
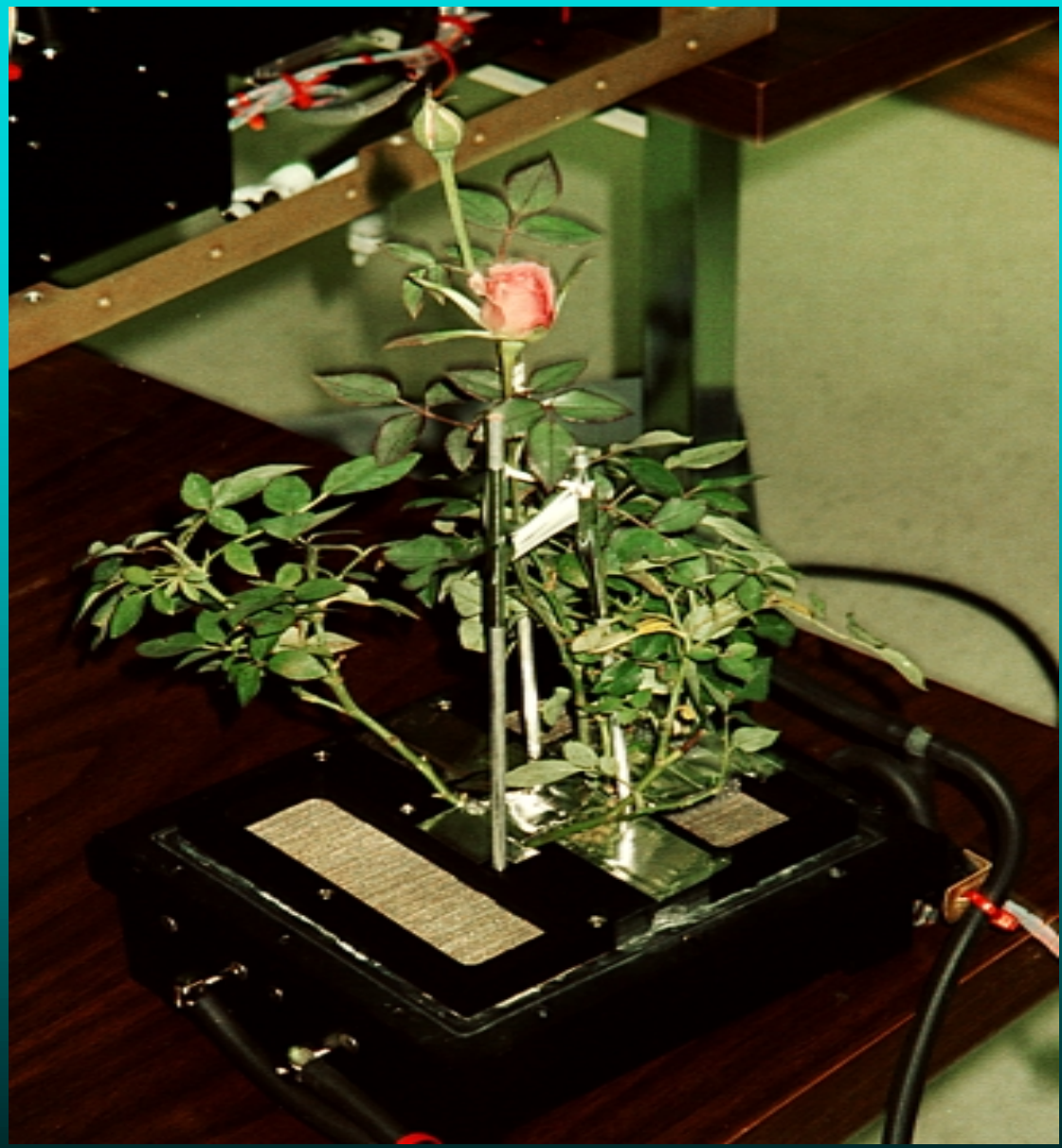


IFF



Astroculture Unit™ built by Dr. Zhou of WCSAR

IFF



Rooting Tray with Rose plant with 2 buds

IFF

Rose Blooming on STS-95 Shuttle - video

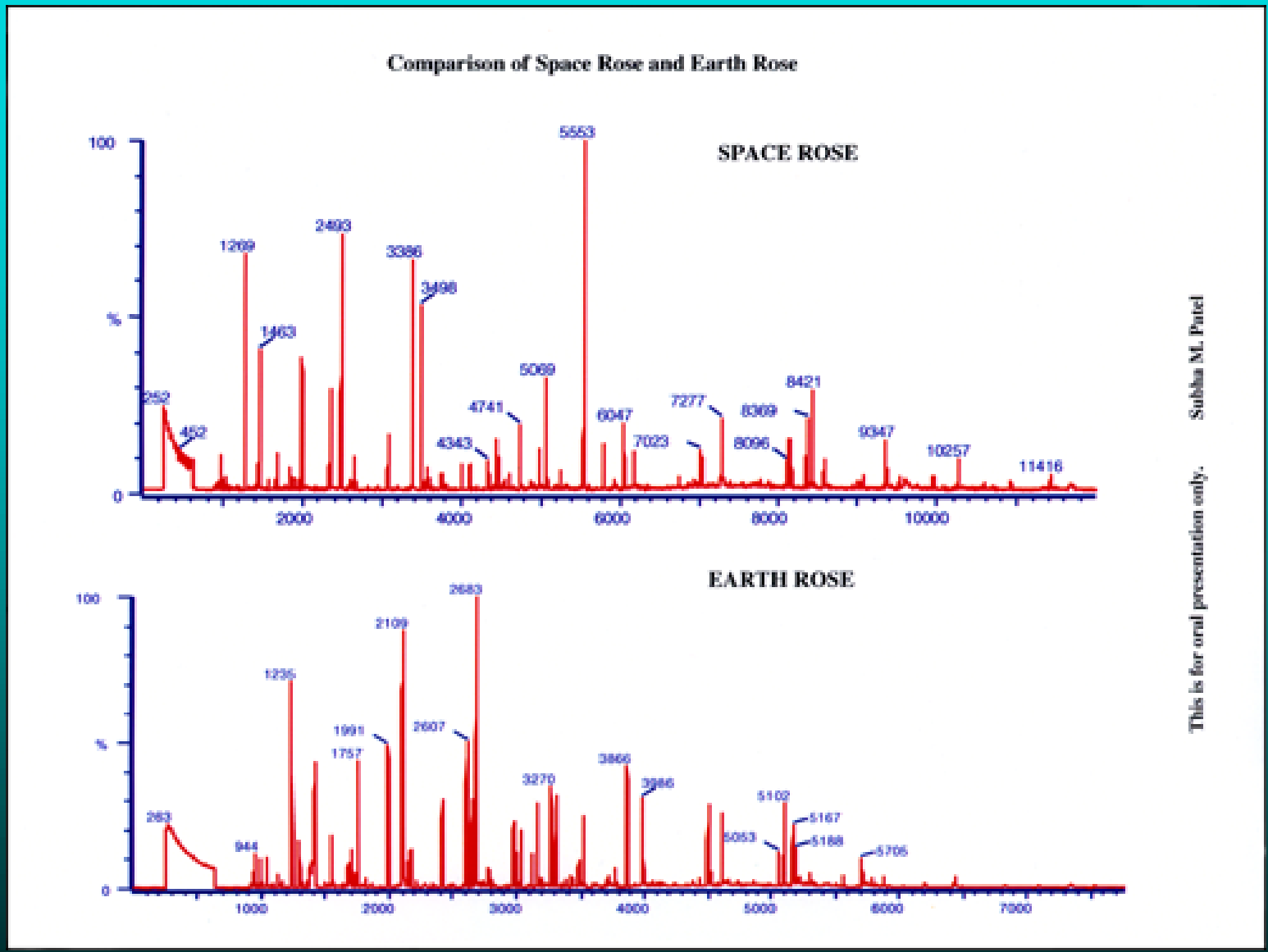
IFF

Rose Flowers when returned to Earth

IFF

Close-up of the flowers

IFF



Comparison of Space Rose and Earth Rose

IFF

COMPARATIVE ANALYSIS OF GROUND SIMULATION vs SPACE EXPERIMENT

	Ground Exp. (Avg. 3 days)	Space Exp. (Avg. 3 days)	Comments
Total Volatiles by peak area	15.3×10^8	6.7×10^8	Decreased x 2.3

IFF

COMPARATIVE ANALYSIS OF LIVING ROSE (OVERNIGHT SCENTSATION) in EARTH & SPACE (average of 3 days)

Compound	Rose bloom in Astroculture™ unit in Earth	Rose bloom in Astroculture™ unit in Space	Comments
Cis-3-Hexenyl/Hexyl Acetate	1.1	0.1	Decreased x 10
Rose oxide	0.3	0.1	Decreased x 3
3,5-Dimethoxy Toluene	0.7	0.4	Decreased x 2
Theaspirane	6.7	1.9	Decreased x 4
Phenyl ethyl acetate	24.7	12.1	Decreased x 2
Phenyl ethyl alcohol	31.0	32.7	*No change*
Citronellol	9.1	14.1	Increased x2
Geraniol	0.9	2.2	Increased x2
Methyl geranate	0.3	0.8	Increased x3
Methyl Eugenol	2.9	2.3	*No change*
Dihydro β-ionol	5.2	8.4	Increased x2
Hydrocarbons (C15-C21)	10.0	16.7	Increased x2
Acids (C12-C16)	3.2	4.6	Increased x2

IFF

RESULTS OF THE SPACE FLOWER EXPERIMENT

- The total aroma volatiles have been reduced under microgravity but the quantitative composition of the rose has changed in a positive way.

- Apparently, this rose plant has grown more in space than earth.

IFF

Shiseido-Japan, utilized the Space Rose fragrance

IFF